The NASA

LangleyEdge

NASA LANGLEY RESEARCH CENTER

NASA Langley Research Center is actively seeking partnerships and collaborations to commercialize its LC Sensor Circuit for Piezo Material Monitoring technology.

The Market Opportunities

Applications of this technology include:

- Determination of integrity of piezoelectric sensors/ actuators embedded in structures
- Health monitoring of piezoelectric elements via embedded leads or wireless RF applies to:
  - Aerospace smart structures
  - Automotive noise control
  - Airbag sensing circuitry
  - Traffic control sensors, smart highways
  - Bridges
  - Industrial print heads
  - Sports equipment:
    - Snowboards, tennis rackets, golf clubs
  - DNA microarray dispensing
  - Non-intrusive diagnostics of implants

The Benefits

Cost effective, quick inspection method

- Multiple element health detection with single interrogation
- Remote testing of piezoelectric elements via embedded leads or wireless RF
- Method is passive facilitating many measurements that were previously not possible
- Obviates the need for standard capacitance measurements which may not be readily available.

The Technology

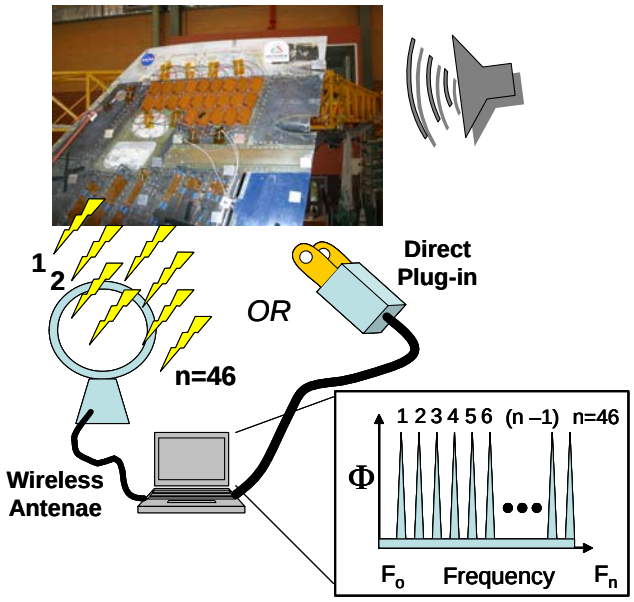
This invention is an application of an inductor-capacitor sensor circuit for determining the integrity of piezoelectric sensors/actuators embedded in structures.

The LC circuit is a passive circuit that contains an inductive coil and a piezoelectric element as the capacitor. If the sensor/actuator is defective, the capacitance of the circuit changes, resulting in a change in the circuit's resonant frequency.

Since the inductor is nothing more than a flat spiral of wire with no moving parts, the innovation provides a tunable circuit whose resonant frequency will change only when the capacitance properties of the piezoelectric device have changed. The new capacitance can be ascertained quickly, offering an approach to troubleshooting. The inductor is placed/switched in parallel with the piezo material thereby forming a resonant circuit whose resonant frequency can be interrogated. The interrogation may be performed in situ or using a wireless or handheld analyzer.

LC Sensor Circuit for Piezo Material Monitoring

Determining the integrity of piezoelectric sensors/actuators embedded in structures



Functional/Operational Schematic for LC Sensor

Additional Information

To discuss in detail how this technology can profit you and your business, please contact:

NASA Langley Research Center
17 West Taylor Street • Mail Stop 200
Hampton, VA 23681-2199
phone: (757) 864-1614 • fax: (757) 864-8314
e-mail: keith.e.murray@nasa.gov